1. Let X be a random variable with possible values $1, 2, 3, 4, 5$ and pdf $p(x) = \frac{x^2}{55}$

    (a) Find the expected value of X

    (b) Find the variance of X.

    (c) Find the standard deviation of X

2. Let X be a RV with probability density $f(x) = \frac{x}{8}$ for $0 \le x \le 4$

    (a) Find the expected value of X.

    (b) Find the variance of X.

    (c) Find the standard deviation of X.

3. We have a coin which, when flipped, shows heads 60% of the time. Let X stand for the number of heads which show in 10 flips of this coin.

    (a) What is the probability that exactly 6 heads show in 10 flips? (Round to the nearest ten-thousandth)

    (b) What is the expected number of heads in 10 flips?

    (c) Find the variance of X.

    (d) Find the standard deviation of X.

4. From a shipment of 500 memory cards, 5 are selected at random for inspection. There are 25 defective memory cards in the shipment. What is the probability that the sample will contain at least one defective memory card?

5. During rush hour, on average 3 buses pass by a certain bus stop every 15 minutes.

    (a) What is the probability that fewer than 2 buses will pass by this stop in 15 minutes during rush hour?

    (b) What is the probability that it will be more than 6 minutes until the next bus arrives during rush hour?

6. 5% of the flash drives coming off a certain assembly line will fail within 10 hours of use. Suppose we look at 20 randomly selected flash drives produced by this assembly line.

    (a) What is the probability that no more than one of the 20 flash drives will fail within 10 hours?

    (b) Check whether the conditions hold to estimate this probability by the Poisson distribution.

    (c) Estimate the binomial probability by the Poisson distribution.

    (d) Check whether the conditions hold to estimate this probability by the normal distribution.

    (e) Estimate the binomial probability by the normal distribution.

7. Find the standard normal z such that $P(Z > z) = 0.025$.

8. The weight of coffee in an 8-ounce can of Maria's Best Coffee has normal distribution with mean 8.00 ounces and standard deviation 0.25 ounces.

    (a) What is the probability that a randomly selected can of this coffee contains less than 7.50 ounces of coffee?

    (b) What is the probability that the can contains between 7.50 and 8.50 ounces of coffee?